

L Number	Hits	Search Text	DB	Time stamp
4	40303	semiconductor near3 laser	USPAT; US-PGPUB	2004/12/02 10:21
5	1425	(semiconductor near3 laser) and MOCVD same MBE	USPAT; US-PGPUB	2004/12/02 10:21
6	1024	((semiconductor near3 laser) and MOCVD same MBE) and wavelength	USPAT; US-PGPUB	2004/12/02 09:18
7	901	((((semiconductor near3 laser) and MOCVD same MBE) and wavelength) and @ad<20021031	USPAT; US-PGPUB	2004/12/02 09:19
8	67901	semiconductor near3 laser	EPO; JPO; DERWENT; IBM_TDB	2004/12/02 10:21
9	37	(semiconductor near3 laser) and MOCVD same MBE	EPO; JPO; DERWENT; IBM_TDB	2004/12/02 10:21

	U	1 [1]	Document ID	Issue Date	Pages	Title	Current OR
1	<input type="checkbox"/>	<input checked="" type="checkbox"/>	US 20020041148 A1	20020411	14	White LED and method for fabricating the same	313/499
2	<input type="checkbox"/>	<input checked="" type="checkbox"/>	US 20010050531 A1	20011213	28	Light emitting device and optical device using the same	313/498
3	<input type="checkbox"/>	<input checked="" type="checkbox"/>	US 20010021209 A1	20010913	39	Semiconductor laser device and method for fabricating the same	372/43
4	<input type="checkbox"/>	<input checked="" type="checkbox"/>	US 6795457 B2	20040921	11	Multiple wavelength surface-emitting laser device and method for its manufacture	372/23
5	<input type="checkbox"/>	<input checked="" type="checkbox"/>	US 6411638 B1	20020625	13	Coupled cavity anti-guided vertical-cavity surface-emitting laser	372/46
6	<input type="checkbox"/>	<input checked="" type="checkbox"/>	US 6327293 B1	20011204	10	Optically-pumped external-mirror vertical-cavity semiconductor-laser	372/96
7	<input type="checkbox"/>	<input checked="" type="checkbox"/>	US 6281523 B1	20010828	22	Semiconductor optical waveguide	257/98
8	<input type="checkbox"/>	<input checked="" type="checkbox"/>	US 6167074 A	20001226	15	Monolithic independently addressable Red/IR side by side laser	372/46
9	<input type="checkbox"/>	<input checked="" type="checkbox"/>	US 6072189 A	20000606	15	III-nitride optoelectronic semiconductor device containing Lattice mismatched III-nitride semiconductor materials	257/14

	Current XRef	Retrieval Classif	Inventor	S	C	P	2	3	4	5
1	257/E33.01 2		Cho, Meoung Whan et al.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	257/E25.02 1; 313/503		Ikeda, Masao	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	372/23; 372/45		Onishi, Toshikazu	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4	372/43; 372/50; 372/68		Song, Young-jin et al.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5	257/98; 372/45; 372/50; 372/96; 438/22		Johnson, Ralph Herbert et al.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6	372/70		Salokatve, Arto K. et al.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7	372/45		Iwai, Norihiro et al.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8	372/23; 372/50		Sun, Decai et al.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9	257/101; 257/13; 257/94; 257/96; 257/E33.02 8; 257/E33.04 9		Duggan, Geoffrey	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

DOCUMENT-IDENTIFIER: US 20020041148 A1

TITLE: White LED and method for
fabricating the same

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Summary of Invention Paragraph - BSTX (30):

[0028] The first light emission part is formed by MOCVD (Metal Organic Chemical Vapor Deposition), or MBE (Molecular Beam Epitaxy), and the second light emission part is formed by MOCVD (Metal Organic Chemical Vapor Deposition), or MBE (Molecular Beam Epitaxy).

Detail Description Paragraph - DETX (2):

[0039] Reference will now be made in detail to the preferred embodiments of the present invention, examples of which are illustrated in the accompanying drawings. The present invention suggests growth of thin films of two different material groups (GaAs group III-V family and ZnSe group II-VI family) on one substrate, to form an LED of two wavelengths, for mixing respective lights from emission layers, to provide a white light or a variety of mixed color lights.

Therefore, the present invention suggests to combine MOCVD (Metal Organic Chemical Vapor Deposition) or MBE (Molecular Beam Epitaxy), technologies for growing a II-V family compound semiconductor, and the MBE or MOMBE (Metal Organic Molecular Beam Epitaxy), technologies for growing a II-VI family compound semiconductor, on one substrate, to obtain a white or a variety of mixed color LEDs.

Detail Description Paragraph - DETX (18):

[0052] Referring to FIG. 5A, a quantum well structured AlGaAs/GaAs/AlGaAs, InGaAlP/InGaP/InGaAlP, or the like, the III-V family compound semiconductor 12, is grown primarily on p-GaAs substrate 11 by MOCVD or MBE. The AlGaAs or InGaAlP is a cladding layer 18, and GaAs or InGa P is an active layer 17. In this instance, by adjusting composition and a thickness of the quantum well of GaAs or InGaP used as the active layer 17, an LED for emitting a red light of a specific wavelength can be fabricated. Then, a metal contact layer 13 of n-GaAs is formed on the cladding layer 18. The grown metal contact layer 13 of n-GaAs serves as an n-contact for both of the III-V family red LED and the II-VI family blue or bluish green LED in common, and is an initial boundary of the II-VI family compound semiconductor. The AlGaAs/GaAs/AlGaAs, or the InGaAlP/InGaP/InGaAlP, the III-V family compound semiconductor, is grown at an elevated temperature of approx. 650.about.750.degree. C.

Detail Description Paragraph - DETX (20):

[0054] The III-V family compound semiconductor 12 is primarily grown by MOCVD or MBE, and the II-VI family compound semiconductor 14 is secondarily grown by MBE or MOMBE, for preventing deterioration of device performance caused by collapse of a boundary and inter-diffusion by setting a secondary growth temperature lower than a primary growth temperature. Thus, the primary growth of the GaAs group III-V family compound semiconductor 12 by MOCVD or MBE is done at the high temperature 650.about.750.degree., and the secondary growth of the II-VI family compound semiconductor 14 by MBE or MOMBE is done at a low temperature 250.about.350.degree. C.

Detail Description Paragraph - DETX (21):

[0055] By the way, a surface treatment for preparation of the secondary growth differs depending on the primary growth method of MOCVD or MBE. That is, if the primary growth is by MOCVD, an oxide film is formed on a surface of the semiconductor layer as the primary grown semiconductor layer is exposed to air. Therefore, in order to remove the oxide film from the surface of the semiconductor layer, the surface of the semiconductor layer is required to be subjected to chemical etching and heat treatment in an MBE chamber. Then, by growing an n-GaAs buffer layer 13 in the MBE chamber, possible defects between the III-V family and II-VI family compound semiconductor 12 and 14 thin films can be suppressed to the maximum. If the primary growth is by MBE, since the substrate is transferred to a II-VI family chamber under a high vacuum for secondary growth after the III-V family compound semiconductor 12 thin film is grown, the growth can be started directly without any special surface treatment.

Detail Description Paragraph - DETX (29):

[0063] Second, in the multi-step growth for fabricating a white LED, the III-V family compound semiconductor 12 is primarily grown by MOCVD or MBE at a high temperature, and the II-VI family compound semiconductor 14 is secondarily grown by MBE or MOMBE at a low temperature, for preventing deterioration of device performance caused by collapse of a boundary and inter-diffusion.

Claims Text - CLTX (20):

19. A method as claimed in claim 16, wherein the first light emission part is formed by MOCVD (Metal Organic Chemical Vapor Deposition), or MBE (Molecular

Beam Epitaxy).

Claims Text - CLTX (21):

20. A method as claimed in claim 16, wherein the second light emission part is formed by MOCVD (Metal Organic Chemical Vapor Deposition), or MBE (Molecular Beam Epitaxy).

US-PAT-NO: 6795457

DOCUMENT-IDENTIFIER: US 6795457 B2

TITLE: Multiple wavelength surface-emitting
laser device and
method for its manufacture

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Detailed Description Text - DETX (8):

Here, the bottom reflection layer 21, the active layer 23 and the intermediate layer 25 are manufactured by MOCVD (Metal Organic Chemical Vapor Deposition) and/or MBE (Molecular Beam Epitaxial) processes.

Detailed Description Text - DETX (10):

The first and second dielectric reflection layers 31 and 41 of the first and second surface-emitting lasers 30 and 40 are preferably manufactured by an optical coating method using a simple general optical deposition system such that the process can be simplified without additional MOCVD and/or MBE processes.

Detailed Description Text - DETX (20):

By the way, as can be seen in Table 1, $\phi_{sub.b}$, σ , and a part of $\phi_{sub.a}$ excluding the part that is determined by the dielectric reflection layer 31 and 41 are already defined with respect to the bottom reflection layer 21, the active layer 23 and the intermediate layer 25 that are applied commonly to all surface-emitting lasers constituting multiple wavelength surface-emitting laser devices that are manufactured by MOCVD and/or MBE

processes. Thus if the phase ϕ_a of the light reflected by the dielectric reflection layer 31 or 41 which occupies the larger part of the role of the top reflection layer changes, then the resonance condition changes. Here, since the phase ϕ_a of the light reflected by the dielectric reflection layer 31 or 41 changes depending on the thickness of a plurality of dielectric layers, the change in the total thickness of the composite dielectric layer makes the resonance wavelength change.

Detailed Description Text - DETX (21):

Therefore, according to the present invention as described above, a multiple wavelength surface-emitting laser device that emits light with desired wavelengths from a plurality of surface-emitting lasers 30 and 40 can be manufactured through a continuous manufacturing processes, by forming the dielectric reflection layers 31 and 41 using a lithography method and an optical deposition system as a later process, without repeating additional MOCVD and/or MBE processes.

Detailed Description Text - DETX (24):

Here, the bottom reflection layer 21, the active layer 23 and the intermediate layer, etc. are manufactured by epitaxial growth using semiconductor growth equipment such as MOCVD and MBE equipment.